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TWO NEW RODENTS FROM THE LOWER SIWALIK BEDS OF INDIA

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The remains of rodents have been exceedingly rare among the fossils found in the Siwalik beds of northern India. Notwithstanding the fact that these sediments have been searched for more than a hundred years by various palaeontologists and stratigraphers, thereby yielding a tremendous quantity of fossil vertebrates, only ten specimens of rodents, representing four genera and five species, have thus far been recorded among the mammalian remains. These species and their occurrences are listed below.

Rhizomys sivalensis Lydekker	Middle Siwaliks
Rhizomys sp. Lydekker	Upper Siwaliks
Hystrix sivalensis Lydekker	Middle Siwaliks
Hystrix cf. leucurus Sykes	Upper Siwaliks
Nesokia cf. hardwickii Gray	Upper Siwaliks
Caprolagus sivalensis Major	Upper Siwaliks

By this list it may be seen that all the rodent material so far discovered is from the middle and upper beds of the Siwalik series. Consequently the American Museum is fortunate in having obtained two new rodents from the lower Siwalik beds, thereby extending the geologic range of this order down into the upper Miocene or lower Pliocene in northern India. The specimens were found by Mr. Barnum Brown, during the course of his field work carried on in the northern Punjab for the Museum in 1922. They are described in the following pages.

The drawings in this paper were made by Margaret Matthew.

Family **Spalacidae**

Rhizomys punjabiensis, new species

Type.—Amer. Mus. No. 19762. The right ramus of a mandible, containing the second and third molars, and the posterior portion of the incisor.

Horizon and Locality.—From the Lower Siwalik beds, near the base. The specimen was obtained at a point near the Sutlej River, about twenty-three miles west and north of Bilaspur, Bilaspur State, Punjab.

Diagnosis.—A small spalacid rodent, about one half as large as *Rhizomys sivalensis*, and about equal in size to *Rhizomys sinensis*. Dental formula 1–0–0–3, as in other members of the Spalacidae. Molar teeth characterzied by an external and two or three internal folds.

This is a rather small species, being somewhat more than half as large as the Middle Siwalik form, *Rhizomys sivalensis.* The lower border of the horizontal ramus is seemingly fairly straight, and above it on the outer side of the jaw, is the anterior portion of the masseteric crest. This crest has its anterior origin below the posterior border of the first molar.

The incisor, which is extremely long, is flat on the inner side, while the outer side is rounded, thereby giving the tooth a D-shaped cross section. The second molar is almost identical in its pattern to the corresponding tooth of *Rhizomys sivalensis*, as figured by Lydekker.[1] There is a deep external fold directed obliquely posteriorly, and three internal folds, which in the worn tooth persist as enamel fossettes. These fossettes are arranged with their long axes placed transversely, and the anterior one, the largest of the three, is expanded on its outer portion.

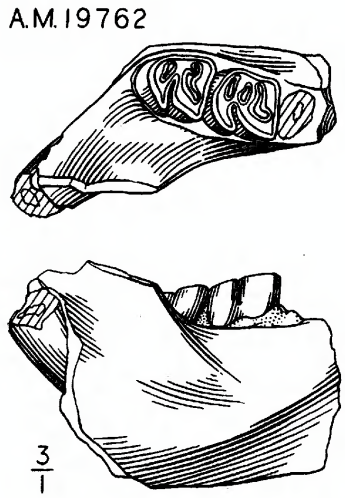

Fig. 1.—*Rhizomys punjabiensis*, new species. Amer. Mus. No. 19762.

Right mandibular ramus, with second and third molars. Crown view above, lateral view below. Three times natural size.

The third molar is similar to the preceding tooth, but the posterior part is somewhat constricted. The outer reëntrant fold is directed transversely, and has therefore crowded the two front fossettes, so that they have become confluent. Consequently there are only two inner fossettes in this tooth, a large one in front of the external fold, and a smaller one behind it.

The teeth are moderately hypsodont.

Measurements

Rhizomys punjabiensis, new species

Amer. Mus. No. 19762.	
Length of RM_2	2.7 mm.
Width of RM_2	2.4
Length of RM_3	3.1
Width of RM_3	2.6
Length of M_2-M_3	5.8
Depth of ramus below M_3	6.0

[1]Lydekker, R. 1884. 'Rodents and New Ruminants from the Siwaliks and Synopsis of Mammalia.' Mem. Geol. Surv. India, Pal. Indica, (X) III, Pt. 3, pp. 106–108, figs. 1, 2.

Rhizomys sivalensis Lydekker

[After Lydekker, 1884—*op. cit.*, p. 107]

Length of three molars	.74 in.	18.7 mm.
Width of M_2	.25	6.3
Vertical diameter of incisor	.17	4.3

Rhizomys sinensis Gray

[Measured from a plate, published by Forsyth Major[2]]

Length of upper molar series	11.5 mm.
Length of M^2–M^3	7.5
Depth of ramus below M_3	13.5

Rhizomys troglodytes Matthew and Granger

Amer. Mus. No. 18411

Length of RM_2	4.8 mm.
Length of RM_3	4.3
Length, M_2-M_3	9.5
Length, M_1-M_3	14.5
Depth of ramus below M_3	14.0

Family **HYSTRICIDAE**

Sivacanthion complicatus, new genus and species

TYPE.—Amer. Mus. No. 19626. Two fragments of the mandible; a right ramus with P_4 (unerupted), and M_{1-2}; a left ramus with P_4, M_{1-2}, and the alveolus of M_3. The left premolar has been uncovered, to show its coronal pattern.

HORIZON AND LOCALITY.—From the Lower Siwaliks at the level of Chinji Rest House. Four miles northeast of Chinji Rest House, Salt Range, northern Punjab.

DIAGNOSIS.—An hystricomorph of medium size, considerably smaller than the modern species of *Hystrix* or *Acanthion*. Dental formula 1–0–1–3. Angle of mandibular ramus very strong, as in other Hystricidae. Hystricomorph pattern of the molar enamel complicated by secondary foldings.

The jaw under consideration represents an animal intermediate in size between *Hystrix* or *Acanthion*, and *Atherura*, though somewhat nearer to the latter. The portions preserved show typical hystricomorph characters, in that the ramus is rather deep, and its lower border is curved, while the angular portion is rather distinct from the ramus. The masseteric crest has its beginning beneath the midportion of the first molar, as in *Hystrix*, and the ascending ramus arises opposite the second molar. The bone enclosing the incisor forms a prominent ridge on the inner, and along the lower border of the ramus, as in *Acanthion*.

The cheek teeth, while they are of typically hystricomorph pattern, are very complicated because of the development of numerous accessory

[1]Major, C. J. Forsyth. 1897. 'On the Malagasy Rodent Genus *Brachyuromys;* and on the Mutual Relations of some Groups of the *Muridae* (*Hesperomyinae*, *Microtinae*, *Murinae*, and "*Spalacidae*") with each other and with the Malagasy *Nesomyinae*.' Proc. Zool. Soc. London, Pl. XXXVIII.

tubercles. Thus the enamel pattern of the worn molar is complex, even though it is fundamentally the same as in *Hystrix* or *Acanthion*. Reducing the tooth pattern to its simplest terms, it is seen to consist of a single external reëntrant fold, directed obliquely posteriorly, and of three internal folds, the anterior one of which is the largest and most complex. For the details of the molar pattern, the reader should refer to the accompanying figure.

Undoubtedly the complex enamel folding in this species represents an early and a rather aberrant specialization of the molar pattern. Yet

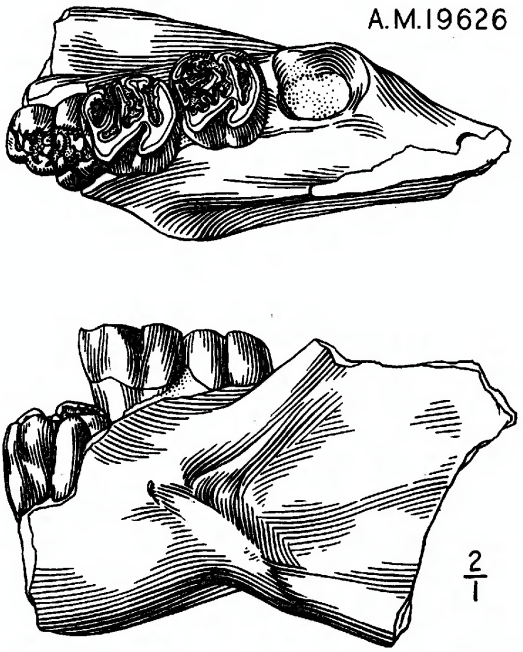

Fig. 2.—*Sivacanthion complicatus*, new genus and species. Amer. Mus. No. 19626.

Left mandibular ramus, with fourth premolar, and first and second molars. The alveolus for the third molar is shown behind the second molar. Crown view above, lateral view below. Twice natural size.

in contradistinction to the specialized crown pattern of this Siwalik form, the tooth itself remains fairly primitive by virtue of its relative brachyodonty. Therefore we must regard this genus as an aberrantly specialized side branch in hystricomorph evolution, a form that developed a complicated enamel pattern, but that never progressed very far towards hypsodonty in the molars.

The genus under discussion is seemingly most nearly related to *Hystrix* or *Acanthion*, to which genera it bears a close resemblance in the

shape of the mandible. Moreover, the tooth pattern is fundamentally similar to that in *Acanthion*. As to size and brachyodonty of the molars, the fossil genus shows certain resemblances to the recent *Atherura*.

Measurements

Sivacanthion complicatus, new genus and species

Amer. Mus. No. 19626.

P_4	Length	6.1 mm.
	Width	5.7
	Height	6.3
M_1	Length	5.3
	Width	5.1
M_2	Length	5.2
	Width	5.4
Length of molar series (M_3 from alveolus)		16.8
Depth of ramus below M_1		13.8

Acanthion subcristatus papae Allen

Amer. Mus. No. 60142.

P_4	Length	8.0 mm.
	Width	6.5
M_1	Length	8.0
	Width	7.0
M_2	Length	7.8
	Width	6.7
M_3	Length	6.0
	Width	5.0
Length of molar series		22.5
Depth of ramus below M_1		20.5

Atherura macroura hainana Allen

Amer. Mus. No. 60146.

P_4	Length	4.5 mm.
	Width	3.5
M_1	Length	4.5
	Width	3.9
M_2	Length	4.5
	Width	——
Depth of ramus		8.3

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